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RESERVATION

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# CONFERENCE

Ge/

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estrial Planets

Lunar Petrology

Planetary Physics

wire to commute, but finally these were overcome by the tenachy and the persuasive pow-In the end, in spite of the practical problems encountered, the program for the Second Polar Year was carried out. Unfortunately, the outbreak of World War II in 1939 reon the suspension of norma international scientific relations. After the end of the war, in 1946, the Conference of Directors of the International Meteorological Organization, at its meeting in London, decided to dissolve all its Commissions. However, at he meeting in Paris in Joly 1946, the rnational Meteorological Committee cre-

ber or foreign associate of unmerous professional societies and academies.

ated the Polar Year Liquidating Commission; this body was made responsible for commuing the analysis of the data, which had al-

Historical Aspects of

the IGY

Secretary General Special Committee for the International

Editor's Note: During the week of September 25-October 3, 1982, an exhibition was organized

at the Academy Palace in Brussels on Belgrum's

celebration of the 100th anaiversary of the First

Polar Year, and the 25th anniversity of the luter-

national Geophysical Year. It was distincted to past

nanonal ecoposysted terr. It was insurated in pure and present geophysical netwities in violet to show the promises of Julius work. Five organizations took part in the exhibition: the Acronomy Institute.

the Antarctic Research Committee, the National

Geographic Institute, the Meterrological Institute.

and the Royal Observatory. King Baudonia gave

his sponsorship and visited the exhibition.

The following article is based on a speech delic-

ered by Marcel Nicolet at the imagination comme-

ny on September 25. The speech, entitled Les ten-

ants et les aboutissents de l'Année Géophysique In-

Geophysics is a branch of science which has

successfully integrated many different areas

of research into a coherent whole. It repre-

sents the synthesis of various broad lields of

knowledge relating to both the past and the

present, and this provides a basis for specu-

lating about the future. Since geophysical re-

reach must be pursued over the whole of

our planet, into the most distant continents,

plication of all man's resources. It recon-

uruds the past through a process of reap-praisal, reflection, and discussion; it clui-

dates the present and thereby leads as not

only to image, to measure, and to study dis-

key which geophysics uses to open thurs leading toward the Inture. Geophysics must

also be accepted as a branch of fitudamental

research in which converted action is an es-

cty by combining research and development

and assesses the value of the knowledge ac-

quired in terms of the contribution it makes

tional Polar Year (1882-1883) was the hist

meniational scale. Weyprecht, who you-

major event in which the fundamental con-

cept was muhidisciplinary cooperation on an

ceived the idea of such a project, was obliged

over a period of several years to delend his

proposals and to promote them. It was not

and a year after his death, and in spite of

small group of geophysicists of the period launched this first great peaceful enterprise.

Polar Year, there followed many important

developments in scientific instrumentation,

and great improvements in communications

within and between the continents. It was in

1927 that J. Giorgi, a meteorologist, made the

ruggestion that the 50th anniversory of the First Polar Year should be celebrated in 1932.

This led to the creation of a Special Commis-

sion which was made responsible for the Second Polar Year (1932-1933); its Presidem

was D. laCour, Director of the Meteorological

Service in Denmark. The preparations for

the event were confronted with many diffi-

culties arising our of the world economic crisis of the 1930s; indeed on several occasions

doubts were expressed about whether it was

In the wake of the heroic epoch of the First

the outbreak of the war in the Balkans, that a

In the history of science, the first Interna-

to the welfare of mankind

tant events, but also to understand better the

and even across Amarctica, it calls for the ap-

ternationale, was translated by C. M. Monnis,

URSI Secretary Geneval Emeritys.

Polar Vear, the 50th anniversity of the Second

Marcel Nicolet

Geophysical Year

ready begun before the War, and for com-pleting the task by December 1950. In this connection it is apportant to recall that the President of the Liquidating Con-mission was John Fleming, President of the International Association of Terrestrial Mag-netism and Electricity from 1934 to 1948, and also Director al the Department of Terrestrial Magnesism of the Carnegie Institution of Washington. Thanks to his worldwide reputation, Fleming was able to stimulate geophysicists into drinking about what future actions should be taken so as to give a fresh aupents to their branch of science. The range f new techniques already available, including the liest tookets carrying scientific instruments, led them to give high priority to making observations in the third dimension. The need to think in terms of a new commitment of some kind was further strengthened by the approaching larger date for the completion of the study of the data acquired during the Second Polar Year: December 1950.

It was in this atmosphere that, in January 1950, I visited the Department of Terrestrial Magnetism and the National Bureau of Standards in Washington, D.C. before spending 6 months in California, Just afterward, in fact on April 5, 1950, Lloyd Berkner made the hist suggestion about the possibility of organizing a series of polar years separated by intervals of 25 years. At a meeting of about 20 scientists (Bares, Berkuer, Chapman, Elvey, Kaplan, Nicolei, Rnach, Tuve, Van Allen, . . . ) in May 1950, beld at Inyokeru. China Lake, in the California desert, there

was some discussion about various aspects of research in the upper autoophere, during which ideas put forward by several participants were borne in mind.
These ideas were raised again in July 1950.

mysteries of nature. Indeed, knowledge is the at a meeting of about 200 scientists who participated in a Conference on the Physics of the lonesphere, convened by A. H. Waynick of the lonosphere Research Laboratory of sential feature; it remains in compet with soci-Pennsylvania State University. On this occasing some of those really to go to Brussels were in layer of officially submining the idea of a new 'international polar year' to the Mixed Commission on the horosphere, which was due to meet in this 'Pulacy of the Academies' September 4-6, 1950. Thus Brussels became the foral point, 25 years ago, for the project which came to be known as the laternational Geophysical Year, 1957-1958.

The Mixed Commission (L. V. tlater Sir Edward) Appleron as Chairman and a membership of Anno, Berkner, Beynon, Booker, Burrows, Maeda, Hagilara, Flanada, Flerhays, Kotani, Lejay, Mattyn, Massey, Menzel, Nicolet, Shapley, and Waynick) forwarded its roposals to the scientific unions represented in it. These were approved by all the unions, including the IUGG, which held its General Assembly in Brussels in 1951 at the invitation of the Belgian National Committee for Gendesy and Geophysics. In May 1952 the International Council of Scientific Unions (ICSU) formed the Special Committee for the Imernational Geophysical Year, usually known un-der the initials of its French title: CSAGI. The members designated to represent the unions were: Berkner and Beynon (URSI). Coulomb and Laursen (IUGG), Norlund and Nicolei (IAU), and Wordie [IGU]. Van Mieghem was later enlisted to represent the World Meteorological Organization.

The first official meeting of CSAGI was atnended by the three senior representatives, Berkner, Coulomb, and Nicolei, and took place in Brussels on October 13, 1952. Through our Secretary, E. Herbays, we appealed to the national academies of sciences adhering to ICSU, as well as to the interested unions and the World Meteorological Organization (WMO), for their collaboration. At the same time, a request for financial suppor was made to the United Nations Educations Scientific, and Cohural Organization (UNES-

The CSAG1 met in this Palace from Jone 30 to July 3, 1953, at the invitation of our Academies, and by this time 30 national academies had already agreed to support the concept of the International Geophysical Year. Before the IGY began, general assemblies were convened in 1954, 1955, and 1956 in Rome, Brossels, and Barcelona respectivel the final Assembly was held in Moscow in July 1958.

The membership of CSAGI was made u of the representatives of the scientific onio with the participation of the WMO. From inception, the Committee had the respons ity for developing a practicable program o observations covering the various discipline of geophysics. The diversity of the topics in corporated in the final program soon resol ed in the inclusion of about 30 members in the Committee:

Accommodation for the General Secretar of CSAGI was provided at Uccle, near Brussels, by the Radianon Service of the Royal Meteorological Institute in Belgium. The tral direction of the program was entrusted

# **Editorial**

# Are You Listening?

After two and one-half years of knocking at your door, AGU-GIFT cannot be a stranger. The acronym, GIFT = GIriling For fomorrow, should be familiar to all members of AGU. The uninher of members who have recognized GIFT with their contributions is increasing each year, yet

we can hardly say that 'the feast is ready.' At the time that the AGU headquarters building was purchased in 1980, it was known that there would lie a morigage of \$1 million-plos on which no major prepayment could be made prior to 1986. ne of us heard opportunity knocking Could we respond? We knew that the membership of AGU includes a large number of retirees who are living com fortably within an upper-tax-brucket income plus many more members, still active, who prosper because of their careers in geophysics. We believed that AGU has comributed as much to this prosperity as any federal agency, university, or research institution. Why, then, should we not reinvest some of our dividends in the future

We compiled a list of Senior Membersformer officers, Medalists, committee chairmen-men and women who represented the prodessional heart of AGU. One of our major tasks was or challenge these members to respond to the initial knock at the door or every member-soliciration by direct mail so that the example of their leadership would encourage others to contribute. We had visious of 50 or more members willing to respond with pledges or gifts of \$1,000 per year for a years. A few shares of stock that have doubled in value since last August would do the same thing. The question now to these senior members is-Horr you really been listening?

Many listened and accepted the chal-lenge. The number of Individual Supporting Members (ISMs) has been in teasing neadify. In 1980 the number was less than 20-now the number is close to 150.

These are the members who contribute at least \$80 annually beyond their regular dues payment. They are demonstrating their support of AGU by a significant aspect of unsellish cooperation. Is it unreaionable to believe that a majority of the Fellows of AGU should be ISMs? The number of Fellows is close to four limitdred, yet less than 15% of the Fellows are

Those of us on the Steering Committee for AGU-GIFT—the dozen or so members who serve as the fund raisers for AGU-believe that Eos should be the messenger to carry the good news and the knock at your door. By using Eos, we climinate a major cost-clirect mailing. Also, the Steering Committee supparis the use of the clues invoice to offer an opportunity for a volumery contribution. Almost 3600 members accepted the opportunity offered by the 1982 dues invoice (mailed August 1981). For the 1983 thres invoice (mailed August 1982) the number is 3877, an 8% increase over the first year There are always a few conscientious objectors in this procedure but they have not

seriously offered any other method. If you believe that you have listened well to the sound of opportunity knocking, look at the latest tabulation of the rotal giving by Sections. You must be encouraged by the percentage of participation but, more impuriant, you should have some concern about the average per contributor. Sorely AGU merits greater support.

We wish to assure you that the members of the Steering Committee retain their good natures. Moreover, we do sincerely appreciate the cooperation of all those who have been supporting the AGU-GIFT Program so generously. We have written our warmest thanks to these con tributors and told them how much their communing support benefits the Union. However, we are concerned. For the full membership, we go forward together and repeat our refraint Are you listening?

> Earl G. Droessler Charles A. Whitten Cochaicmen AGU-GIFT Steering Commutee

#### AGU-GIFT Contributions as of April 18, 1983 Number of of Cash Average per Unpaid Contributors Members Received Contributor Pledges button Section 535 \$ 530 \$15,379 \$14,849 Annospheric Sciences 5,765 20.314 11811 10,710 33 11,620321Geomagnerism and Paleomagnetism 1.424 17,329 13,185 1,827 15,010 653 252 24 20 19 400 6,472 583 710 380 140 12,225 11,845 Seismology 13,606 13,746 Relationship 2,805 Tectonophysic 11,111 300 14,411 Volcanology, Genehemistry Petmlogy 4.645 No section 2,100 2.100 2,500 Designated for Merle Tuve Memorial-\$3,150 37 \$136,70I \$24 \$14,551 \$151,252

to a bureau, whose members were: S. Chapman, President (U.K.); L. Berkner, Vice-Presideni (U.S.); M. Nicolei, Secretary General (Belgium); J. Coulomb, Member (France); and Y. Beloussov, Member (USSR).

In addition to the bureau, there were 14 discipline reporters, each of whom was reponsible for one of the scientific disciplines. They are listed in Table 1, and their names and interests give some idea of the scope of the program as a whole. Finally, the CSAGI included several assistant scientific sceretaries who were given the task of organizing a number of International conferences, each designed to deal with questions of particular in terest to a geographical region.

For each of the disciplines, the program was first elaborated by a committee created under the auspices of one or more of the

unions and scientific associations adhering to ICSU. After this preliminary stage, the IGY program as a whole was studied by the bureau and by CSAGI, and was finally coordinated during the general assemblies, at which all the participating academies were repre-sented, and nlso during the regional conferences mentioned earlier. Other conferences were held to discuss questions concerning re-lated groups of disciplines. One of these, held in Washington, D. C. from September 30 to October 5, 1957, dealt with the problems of rockers and satellites and coincided with the launch of Sputnik 1, the first artificial earth satellhe, on October 4.

It would not be possible here to review all the preparatory work carried out within each discipline. Briefly, each Reporter carried the responsibility for editing an Instruction Man-

Activity		Reporters
World Days		A. H. Shapley (U.S.)
Meteorology		J. Van Mieghem (Belgium)
Geomagnetism		V. Laursen (Denmark)
Aurora and Airglow		S. Chapman (U.K.) (with F. Re
		C. Elvey, both U.S.)
Ionosphere		W. J. O. Beynon (U.K.)
Solar Activity		Y. Ohman (Sweden)
Cosmic Rays		j. A. Simpson (U.S.)
Longhudes and Latitud	es	A. Danjon (France)
Glaciology	and the second section is	J. M. Wordie (U.K.)
Oceanography		G. Laclavere (France)
Rockets and Satellites		L. V. Berkner (U.S.)
Seismology		V. V. Beloussov (USSR)
Graylmetry		P. Lejay (France)
Noclear Radiation	A Charles to the	M. Nicolet (Belgium)

# the CONFE **Exclusively by**

Chronology

Now Your

eserve

Marcel Nicolet received his Ph.D. in astrophysics of Liege University in 1937. Since 1951 he has een associated with the lonosphere Research Labotalory of the Pennsylvania State University, where he is an adjunct professor of aeronomy. From 1953 to 1960 he was Secretary-General of the IGY. In 1960 he was director of Belgium's National Space Research Center and in 1965 became first director of the Belgian Acronomy Institute. He was president of the International Association of Geomagne-tion and Aeronomy from 1963 to 1967, A retired professor of external geophysics at Brussels University and of space physics at Ligge University, he has more than 200 publications in the fields of astrophysics, aeronomy, and meleorology and is a mem-



The CSAGI Bureau, IGY's international board of directors, at Uccle, near Brussels, June 1957. Left to right, V. Beloussov of the USSR, L. Berkner of the United States, Al. Nicolet of Belgium, J. Coulomb of France, and S. Chapman of the United Kingdom (Photo by Loomis Dean, Life Magazine, \$1957 Time, (nc.)

nal containing sections prepared by experts. Allout a thrzen of these manuals were distributed to the IGV partiripating committees befure the heginning of the observational program, and were published in Annals of the RG. In addition, each of the unions interested in the IGV had already sent out information on the essential elements of the programs with which it was concerned.

Because of limitations on the number of scientists and on the availability of equipmem, not to speak of linancial restrictions, attention was concentrated on three geographical ateas: the Arctic, the Amaritic, and the equatorial helt. These satisfied certain geographic and geomagnetic conditions determined by the requirements of the various disciplines, and took account of the logistical fa-olities then available. In abblition, three other zames were superimposed on those just men-tioned; these were defined in terms of geographical meridians and corresponded to the comment of North America, Europe, Africa, and the Far East (or 140°E). Thanks to the plecision to concentrate attention in certain geographical regions, it was possible to econoprize when eleciding on the locations of new stations, while at the same time facilitating the acquisition of representative data for most geophy sical phenomena.

Some idea of the vast scale of the preparations for the IGY can be gained from the fact that the first 10 volumes of Annals of the RO. which were theoreth to this aspect of the program, comain 5,000 pages.

It is worth recalling that, as early at 1953, the IGV Bureau had to escenthe possibility of launching artificial satellites in 1957 or 1958 during the IGY. Indeed, this was borne in miml when the IGV symbol was designed by the IGA' Secretariat in 1954; it showed the trajectory of a satellite across a background of lines of laritude and longitude as well as the boundary between night and day, and it emphasized the privileged place given to th

Here today, in the marble hall of this Palace, run will find the exhibition commemorating the 25th Anniversary of the ICV. It was in that same hall, at 6:45 P.M. on July 29, 1955, that the first announcement was made of the future launch of an artificial satellite. As Secretary General of CSAGI, I had that morning received, by special messenger, a lester from the President of the U.S. Natiunal IGV Committee. The news of the ronting event was publicly announced in Brussels at the local time corresponding to the time of the official announcement made simultaneously in Washington, D. G. and in 40 countries participating in the IGY.

1957

ANNÉE

**GÉOPHYSIQUE** 

INTERNATIONALE

INTERNATIONAL

GEOPHYSICAL

YEAR

At the beginning of 1956 I invited the IGV Contmittee in the USSR to consider participating in the program involving rockets and satellites. The invitation received an immediate welcome, but the official announcement of the plans envisaged was not made until the General Assembly of CSAGI in Barcelona in September 1956.

The first use of artificial satellites for scientific research during the IGV was in itself an ontstanding event, but it marked also the beginning of an intensive exploration of the terrestrial environment in space, which has since led to the even more remarkable arhievements of the present time. The explosion which took place 25 years ago in studies of aeronomy in association with terrestrial magnetism resulted in a profound modification of the basic ideas that had formerly been accepted in investigations of the relations between solar and terrestrial phenomena.

The subject of terrestrial magnetism quickly ilivided into two different aspects, each corresponding to particular types of experimental and theoretical investigations. The first of these is internal magnetism, whirlt relates to the physics of the earth's interior, while the second, external magnetism, refers to the extremely complex variations caused by changes in the geometry of the lines of magnetic force; these can occur at distances ranging from 10 earth radii down to an altirade of 1000 km. It is for this reason that certain characteristics of the ionosphere and also the modulation of extra-galactic cosmir rays are both closely connected with the variations in the magnetic held that take place at the outer limits of the atmosphere. The simultaneous study of such phenomena during the IGV led naturally to a logical rearrangement of the disciplines, which recognizes the morphological coherence of the various ele-

ments now included in 'external geophysics.' The successful planning and preparation of such a romplex operation as the IGY was greatly facilitated by the great flexibility of the organizational structures adopted, and also by the cooperation of the most distinguished representatives of the international scientific unions. In addition, a grant of \$100,000 made by UNESCO and the contributions (\$200,000) received from the participating committees made it possible to maintain a permanent Secretariat at Uccle cluring the 6-year period from 1953 to 1959. This Secretariat, without which I could not have fulfilled my responsibilities, consisted at lirst of Phillip Mange and Delphine Jehoulet, now in the United States; they were joined later by Paulette Doyen, Mike Baker, and Francine and Maurice Hautsenne, who are present to-

1958

Forum

#### NASA and SEEP

In the recent news note by R. F. Harris entitled 'Octraing Flortron Principalmon' (Em. March 22, 1983, p. 114), it is stated that NASA performed an experiment 'similar' tie the Navy's Stimulated Emission of Energetic Particles (SEEP) satellite program using someting on ket X ray defecturs. The NASA effort was actually a reoperative part of the SEEP program than was, with the exception of the two enall NASA rockets, quantored entirely by the Office of Naval Research. The SEFP program originated at Lockherd Palo Alio Research Laboratory and Stantond University and was well along belone Dr Goblierg at Goblard Space Flight Center and his convestigators at Cartiell and the University of Denver were invited to par-

Even the rucket lannabes were coundinated with the Navy and Lackbred petsomel, so that the NASA project was always dependent upon the Nary's SEEP program. We at NASA are pleated that SEEP was successful, and are proud to have been part of that overall storcess; hawever, the credit has the conception and execution of SEEP should go to the Navy and the researchers whom they sponsored at LPARL and Stanlord.

> John T. Lym h Earth Science and Applications National Acomentus and Space Administration Washington, DC 2015 to

#### Giving Through Life Insurance

Your Union's Gift Steering Committee has pointed out from time to time various methods of contributing to the Union that may provide certain nicinbers with the citiafaction of recognizing the value and attainmenta of the organization, and the part it played in the individual's career, combined with a maximum of convenicirce as well as tax and other advantages. One such method is to make the Union a bencheiary of one or more life usurance policies.

The committee recently learned of an example of surh giving that seems so pertinent to the committee's thinking that it is here called to the attention of the membership. The example is a gift to The George Washington University (GW) and was discussed in some detall on page 3 of the November 1982 GW Times untiler the heading 'Getting and Giving: Carol Brus-

t and Drosman intered the university 1957 refule also not king full time a fee. National Science Foundation, in 1960 le. lone she had graduated, she suffered as verte bank impress She had in west abut piere, and was in River britter 1858; 5 cours. Her cohorational plans were appr catte wier ked. Nothing damied design len y to senty us outly as the sarapeter in 1477, resumed her educational case part time at the innversity with maker considerated and help from Friends to the Liculty. She received a degree in lifor you 1981 and currently is sculing to ward a master's degree. A grandul Carol Brosnan has used

several mous of the university to benefit substantially from a life insurance policy that most have a calife exentually of an proximately \$75,0000

The article points our that. The abatages of making a gift of life insurance the moversity are many. The gift is tertant, not open to contest, nor subjects products costs. The proceeds are payable inmortiately at death in each with the beneficiare or beneficiaries receiving all the proceeds.

Since life managers is given in small, regular amounts, . . . the down builded nes for the charits over a long period of mine. This convenience has made it easie for Brosnan, who lives on a fixed inone as provide her alma mater with a largean-average gib.

'A gift of life insurance is a personal living charaction. The change can be not generous by giving life insurance because the proceeds are paid directly to the this ty, thereby saying estate settlement rosts In addition, ouc's existe a not diminished because life msurance, bris very nature, creates what amounts to a idditional, separato estate."

And finally. A life insurance gift is onvennern. Numerous alumni and friends may already have on hand policies that have fulfilled their original purposes and could now be considered for dealable purposes. Changing the benchian and owner drip on a policy is a relatively single process. And by naming GW as poky owner and beneficially, the donor carakt an income tax charitable contributede l the time on the insurance premium poil inach visa 2

to those ALH members whom this panordar show may be, my substituting in the paragraph just quoted 'members' for alumni and 'AGIC by 'GAS'.' It's a good thought

AGII-GIFT Steering Committee

day. Sir Archibald Day (Coordinator) and Sir Harold Spencer Jones (Editor of the dunah of the IGY) hoth died several years ugo.

As for the results achieved thirting the IGV. it would be sprite impossible or review them here since their description takes up 38 volunics of the Annals. The completion of this scries of 45 volumes was made possible by the creation of the International Geophysical Committee (CIG) after the dissultation of CSAGI in 1950. This Committee also laid the foundations for a new program of observa-tion: the International Years of the Quiet Sun (IQSV), 1964-1985.

Before concluding, I must refer to the way in which a voluntary organization including representatives of 117 countries succeeded in steering such a complex project to a success-

The first important achievement uf the IGY was that it attracted the attention of thousands of men and women from ull parts devoted their efforts to the attainment of a common scientific objective.

Besides this, the enterprise was able to henefit. from the support of governments without itself being a governmental body; in addition it could count on logistical support provided by armed forces without being in any way mllitary in character. Finally, although the IGY was based on international collaboration between scientiats in 67 countries, it was able to avoid becoming involved with the rigid framework of eatablished International orga-

The IGY successfully attained its main objectives, but it would be wrong to conclude that the political conditions of the period were always favorable. I shall not refer here to various events, relating to the international political situation, which often complicated. the jask of those who were engaged in the direction of the enterprise; these might, perhaps, be a subject for another occasion. To-day, I shall simply say that the geophysicists kept their feet on the ground and, although they were aometimes obliged to express disapproval, they never gave way. They kept their eyes firmly fixed on the ultimate objeclives, and their will to attain these was sufficiently strong to enable them to surmount the natural and the artile ial larriers that bo rm umtered.

In the final analysis, the IGY can be teparded as a crucible out of which the sixof graphysics emerged with new, permanent characteristics, it served to deline remain nublclines, and these have slace determine the directions in which modern geophysic urscan h is now progressing. Today then search is carried out to an numesphered ternational collaboration, the origins of alid an unknown to the present generation E cry true geophysicist accepts this collabortion without legitation and in a spirit of sientilic rivolry in the service of mankind.

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lews

# Keyworth Urges **Setting Priorities**

A strong advocate of scientists setting pri-orities within their disciplines, George A. Keyworth, II, President Reagan's science advisor and director of the Olfice of Science and Technology Policy, recently offered three possible consequences it such priorities are

'I'm especially worriest about the continued inability-or unwillingness-of the science community to agree anong themselves about priorities—or to abide by their decisions when they can agree, he said [emphasis his]. I wouldn't think it necessary that I remind them diat these are tough times. I'll aild that for anyone depending on federal funding. they're going to remain tough, times for quite a while,' Keyworth told the American Physical Society at its mid-April meeting in Baltimore, Md.

There are three choices, none of them good, Keyworth continued. 'It may be that funding increases will simply be deferred until the community can come to some consensus. Or decisions may be based on surh nonscientifically relevant factors as preservation of politically popular facilities. Or disaffected minority viewpoints, when they're the dominant messages transmitted to the decision makers, may well carry the day. I come back to the central point: The community has in be willing to establish its own priorities and then stand by them in the public arena.'-



The Weekly Newspaper of Geophysics

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Cover. A plaque rerognizing the major contributors to the AGU GIFT rampaign now hangs in the eighth floor lobby near the executive offices at AGU headquarters. This issue includes the first 1983 update on the GIFT fund: the Editorial and Forum pieces by members of the Steering Committee; the list of Individual Support ing Members; and a pledge card on the back cover. If you have not been able to participate in this program to strengthen AGU, use the pledge card to do so now. The following members have contributed \$1000 or more and are recognized on the plaque: Philip H. Abelson, L. Thomas Aldrich, Richard J. Anderle, Robert R. Benneu (In Memoriam), Allan V. Cox, Samuel S. Goldich, Pembroke J. Hart, A. Ivan Johnson, Helmut E. Landsberg, Paolo Lanzano, Thomas F. Malone, Murli Manghnani, L. L. Nettleton, Hyman Orlin, Erick Schonstedt, Athelston Spilhaus, A. F. Spilhaus, Jr., John W. Townsend, Jr., James A. Van Allen, Charles A. Whit-

ien, and J. Tuzo Wilson,

. . :...

# Copyright Suit Partly Settled

Amidst continuing ronfusion on what constitutes 'fair use' photocopying of copyrighted material, the hrst legal action taken against an academic institution and individual professors for alleged violations of copyright law has been partly settled. Nine hook publishers charged last December that New York University (NVU), several of its faculty, and an off-campus consinercial photocopying establishmeni had violated copyright law. The action against NYU and its facility was settled out of court. The portion of the lawsuit directed against Unique Gopy Center will ron-

The suit, coordinated for the nine publishers by the Association of American Publishers (AAP), underscores the need for professors to understand the law concerning photocopying multiple works for classroom use and to understand when they must seek permission from a publisher before photocopying copy-

righted material As part of the seulement, NVU agreed to enforce through December 31, 1985, classroom guidelines (see box) that were developed in 1976 by educators, authors, and publishers when the new U.S. copyright law was enacted. These guidelines are part of the leg-islative history of the law and are contained in a committee report of the U.S. House of Representatives. NVU agreed to spell out the policy in its faculty handbook, to investigate allegations of copyright infringement by its faculty, and to discipline faculty members found guilty of such intringement. The university has instructed its faculty to use these classimum gublelines to determine il copyrighted material may be photocopied. XYU also gave its faculty a procedure for determining when there is fair use beyond the

guidelines (copyright law may allow for pho rocopying beyond that which is outlined in the guidelines, which state the minimum wandards of the Tair use doctriner: If the guidelines do not allow for photocopying, permicsion must be sought from the publisher. Faculty who have sought permission has feel they have been unreasonably denied it should consult with university counsel. If university counsel is not sought. NVU says it would not defend the faculty member if litigation ensues Many university professors view the photo-

opying of material from pournals and hooks but their students as essential. Often, for many specialized subjects, professors copy journal articles and portions of books to fill the gaps in textbook material; to provide stutlents with the research results from the frontiers of their field; and to ensure that a large class has access to key portions of the literature Carol Risher, AAP's copyright director,

jobl Eos that AAP recognizes that photocopy ing to keep students at the frontiers of a particular academic fiebl is a rreative reaching merland and, as such, is 'nut seeking to stop or limit photocopying. We want the copying to continue, but with [the necessary] permissinn,' she emphasized.

Most of the cunfusion centers on the interpretation of the 'fair use' doctrine of section 107 of the ropyright law (P.L. 94-553), entitled 'limitations on exclusive rights: falr use." Four tests are upplied to determine if a given instance of library photocopying is fair use: the purpose and nature of the use; the nature of the copyrighted work; the amount and substantiality of the portion used in relation to the work as a whole; and the effect of the use upon the potential market for or value of the copyrighted work.

To help eliminate confusion over section

107, the Ad Hoc Committee on Copyright Law Revision, the author-publisher group of the Anthors League of America, and AAP established a set of guidelines for classroom copying, which are 'not intended to limit the types of copying permitted under the standards of fair use under judicial decision,' acrording to the prologue to the guidelines.

There may be instances in which copying which does not fall within the guidelines stated below may nonetheless be permitted un-der the criteria of fair use.

AAP hopes that the sult and settlement will encourage other universities to adopt similar or identical policies to those adopted by NYU. AAP is pleased, Risher said, that the university is taking responsibility for the be-liavior and actions of its faculty and hopes that other universities will du the same. The Johna Hopkins University and Yale Universiy already have recommended similar guidelines to their faculty.

AGU, an AAP member, has been trying to educate membera about the copyright law and about the financial impact on journala that are widely photocopied, according to Judy G. Holoviak, AGU Director of Publicationa, Marketing, and Public Information. All tiona, Marketing, and Public Information. All AGU, journala contain a copyright statement that begins, 'Permission is granted for individuals to make angle copies for their personal use in research, study, or teaching, and to use abort quotes and figures and tables from this journal for publication in scientific

books and journals. There is no charge for any uf these uses; AGU requests that the source he cited appropriately.' For uses other than these, AGU participates in the Copyright Glearance Center and collects copying fees through them. The Copyright Clearance Center, located in Salem, Mass., acts as a centralized source for anthorization to photo-

copy for 700 publishers and 6,500 titles.

Nine NYU faculty were named in the original nal suit; since then, one has died. The nine publishers involved are Addison-Wesley Pulishing Go., Inr. Basic Books, Inc., Publishers; Houghton Mifflin Co.: Simon & Schuster, Inc.: Allred A. Knopf, Inc.; Random House, Inc.: the National Association of Social Workers: Macmillan Publishing Co., Inc.; and Litle, Bruwn & Co.—BTR

#### Law and Guidelines

The text of section 107 of the U.S. copyright law (P.L. 94-553):

'Notwithstanding the provisions of sertion 106 [exclusive rights in copyrighted works], the fair use of a copyrighted work including surh use by reproduction in copies or phonorecords or by any other meana specified by that section, for purposes such as criticism, comment, news re porting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular rase is a fair use the factors to be considered shall

'(1) the purpose and character of the use, inclining whether such use is of a commercial nature or is for nonpredit

educational purposes; '12) the nature of the copyrighted work (3) the amount and substantiality of the iorijon used in relation to the copyrighterl work as a whole; and

'(4) the effect of the ner upon the potential market for or value of the copyrighted work."

Highlights of the classroom guidelines Teachers may make single copied for

cholarly research or for preparations for teaching a class. Multiple copies (not to exceed more than one copy per student in a comset niny he made for classroom use if the

copying meets tests of • lucyity. The gnolelines set worth count limitations for poems, prose, illustrations, and 'special works.' Fitting into the guidelines' definition of brevity are, among oth ers, works of prose of less than 2,500 words; excerpts of 1,000 words or 10% Iwhichever is less) of a longer piece; and one rhart, graph, diagram, strawing, rartoon, or pirture per book or per periodi-

cal issue. spontaneity, defined as copying 'at the instance and inspiration of the individual tearlier' and that the 'inspiration and deci tion to use the work and the montent of its use for maximum tearning effectiveness are so close in time that it would be inreasonable tu expect a timely reply to a

equest for permission • cumulative effert, which means that the copying is for unly one course in the school, and, iluring one class term, not more than one short poem, article, story, essay, or two excerpts may be ropied from the same author, nor more than three from the same collective work or periodical volume. For one course during one term professors may hare a maximum o nine instances of muldple copying. In addition, each photocopy must in-

lude a notice of copyright.

The guidelines clearly prohibit the use of photocopying to create an anthology. e or replace nnthnlogiea. compilations, collective works, the pur chase of books, reprints, or periodicals. In addition, 'There shall be no copying of or from works intended to be "consumable" in the course of study or of teaching,' including workbooks, exercises, standardized tests, and test booklets and answer sheets. Copying of the same item by the same teacher may not be repeated from term to term. Students will not be charget

nore than the actual photocopying costs.

The guidelines, which are part of the legislative history of the copyright law, were developed in 1976 by the Ad Hoc Gommittee on Copyright Law Revision, by the author-publisher group of the Au-lhors League of America, Inc., and by Association of American Publishers (AAP).
The official and complete set of classroom guidelines is available free of charge from AAP, 2005 Massachusetts Avenue, N.W., Washington, DG 20086. A booklet explaining library photocopying under the photocopying law, 'Photocopying hy Aca-demic, Public, and Nonprofit Libraries,' which was prepared in May 1978 by AAP and the Authora League of America, Inc., la available from AAP for \$2.

# Apollo 18?

Allan Hills, Antarrtica, was the site where meteorite sample ALPHA81005 was discovered recently, emprisoned in pular ice (Eas., November 30, 1982). Within the past few months there has been an intense effort hy several groups of investigators in the United States and a few in Europe to analyze small fractions of what was initially a small (3  $\times$  2.5 × 3 cm) specimen of the meteorite. The reason for the excitenient is that A81005 has probably turned uut to be a sample of the

Results of the studies are the first tangible evidence that fragments of the moon's surface can be ejected and land on the earth. It is assumed that such a sample escapes from the moon's gravitation after ejection by impact of a meteorite on the lunar surface. It is also assumed, of course, that we know enough about the chemical and physical properties of the moon's surface rocks and minerals to make a positive identifiration of such a sample. The results of the studies go far beyond the testing of ejecta-trajectory cal culations, mass-velocity distribution models, and earth-moon orbital dynamic theories. This sample may be the first evidence of the complex chemical and physical interaction of the earth-monn system. For now, the excitement and focus of the

investigations bears on state-of-the art measurements and analysis to decipher ANItm5's innicate history. Referring metaphorically to A81005 as being the most recent Apadla mission, R. L. Korotev, L. A. Haskin, and M. M. Limbstrom of the McDonnell Center for the Space Sciences at Washington University, Sc. Louis, presented a discussion at the March Limar and Planetary Science Conference 14 (LPSC 14) in Thousant entitled 'So Apollo 18. Flew, but Where Did It Sample? According to them, the Allan Hills sample had a cosmic ray exposure age of no more than about 1.5 million years and a residence time in the Antic ice of no more than BOR domsand years. based on tolle and 26Al values. Compatible with an origin on the moon's surface is the analyzed ratio of FeO to MntO of 65.8 (whole rock determined in A81005 by several investgators and reported at an LPSC 14 special session emitted 'Mercorites from the Earth's

W. V. Boymbar and D. A. Hill of the Limar and Planetary Laboratory, University of Arizona. Turson, stated at the conference that More convuicing data for a linear origin of A81005 is provided by the abundances of in compatible trace elements." Their results and those of other groups indicate a close alliance of A81005's patterns of rare earth elements to those of Apollo 16 Highlands breecias. According to Buymon and Hill, 'The presence of a KREEP type pattern in A81005 requires that this meteorite came from the moon.

Bornton and Hill acknowledge that the component of KREEP to specialized, extremely fractionated cumplement of potassium, rare earth elements, and phosphorous found in some lunar Highland rocks), although very closely identified with the moon and its history, could have formed from an identical body somewhere else in space. Ther conclude, however, that 'It is most unlikely that this pattern could be established on an wher parent body nuless it had a similar bulk composition, size, and thermal history as the moon. Such a parent body clearly does and exist in the solar system.' Such a body could exist outside of our solar system, but even su, the exact conditions that would be required to cause the very extreme fractionations to produce KREEP would be immensely diffiult to generate. On the mood, it is thought that the KREEP component fractionation product was formed only once and later was mixed into other rocks that now cuntain it. such as is observed in many lunar highland anorthoshic rocks.

The oxygen isotope compo nar patterns, according to the results deter-mined on AB1005 by T. K. Mayeda and R. N. Clayton of the Eutleo Fermi Institute, Chicago, Ill., and reported at LPSC 14. In delining this pattern as lonar, Mayeda and Clayton noted that differences in oxygen isotope ratios in various planetary bodies are established at the time of their accretion. The earth, the muon, and aubritic meteorites lie un a unique line when plotted un a Ihrec-iso-tope graph. All other extraterrestrial samples are either richer in poorer in 100. Accuriling to Mayeda and Clayton, 'A81005 is identical. in isotopic composition with the Apollo 16 breccia, and is distinctly different from the eucrite samples. Of all the known sources uf the adar system rocks, only the earth, the moon, and the aubrite parent body have oxygen compositions compatible with that of A81005, .... leaving the moon as the likely

If rock fragments from the moon are being found on the earth, it should be possible to explain the processes of ejection and trans-port. H. J. Melosh of the Lunar and Planetary Laboratory concludes dust both theory and experiments suggest that aignificant amounts of ejecta may even exceed the es-

IGA's emblem drawn by the IGY Secretariat in 1954 (see text).

cape velocity of the motion . . . 1LPSC 14). Ore the basis of observations of explosive behavют, some unclear. Melosh was able to calculate that fragments relatively free of shock damage are 'spalled off' at the edges of impart craters, the particle size being related to the physical properties of the impacted lunar-

Once at velocities exceeding lunar escape, hunar surface ejectu could follow several romes. According to D. E. Gault of the Mirrphys Genter of Pkoretology in Murphys, Calif, it is estimated that the moon is currently losing 109-100 grams/yr. (If this total mass) loss it appears that no more than  $10^7 - 10^8$ grams/yr are accreted by cirth, the total derived from both direct trajectories and the "cloud" in geocentric orbits testimated to be of the order of 1000-1011 grams)."

The origin, the process, and now a sample whose compositional intricacies decode to a lunar formula, set the scene for a translanarcarth system.—PMB

## New Funds for Major Equipment

Earth sciences laboratories in the arademic world have been in desparate need to replace, improve, or ritherwise ulitain research apparatus in recent years. The grants agail-able from federal government agencies have not allowed for major equipment purchases, but very terent changes in fount allocation now provide for the purchase of major apparatus for analysis, experimentation, hebb studies, and for computation and data processing in the earth sciences. Such equipment is described by a guirleline brochure recentle released by the National Science Foundation (NSF), Division of Earth Sciences, as being 'community two expensive and of too local potential use to be adequately justified by a regular research proposal.' To initiate the program, NSF has alborated \$5 million for

earth sciences equipment in fiscal cear 1981. There are a few key factors to be considried in applying to the NSI for major research equipment. The title for such a proposal should read 'Acquisition of . . .. 'Ppgrading of . . .. or Development of . . .." which would imply that money for new, re-Infhished, or constructed apparatus is being requested. The equipment must be initially intended for a well-defined research project that must be described in detail. Institutional contributions in the forprof matching builds and supporting costs would help the applica-

The rheadling for softmission of proposals is September 1, 1983. This provides a relatively short time to prepare a major proposal. A description of the particulars war adable from the Data Support Services Section, EAR/EQ. NSF, Washington, DC 20550, or by calling lan MacGregor, Deputy Division Director. Division of Earth Sciences, at 202-357-9591.--PMB

### **Knapp Confirmed** As NSF Director

Edward A. Knapp was confirmed by the Senate in a vrice sore on April 15 as the director of the National Science Foundation (NSF). The Senate vote followerl a confirmation hearing by the Sepate Labor and Human Resources Committee. Knapp, whra was nominated by President Reagan to head the frainflation in November, half been assistant director for NSF's mathematical and physical sciences (MPS) directorate since July 1982.

Allegations that he has been politicizing NSF have beleaguered Knapp since he asked for resignations or litur commitments to leave from three NSF top administrators in December Itwo of these administrators had been planning to leave, through an resignation ilate) had been sett. Knapp assured the Seuate committee during the April 13 confirmation hearings that he marle the decision or ask for the resignations and that, although he had discussed his plane with Office of Science and Technology Policy officials, they did not request that certain people be removed in exchange for particular increases in the NSF budget. Knapp musistently has defended binuself against the allegations by saying that

he wants his own team at the agency. The National Sciences Board and Knapp alteady have sent a list of moninces but the NSF deputy director to the White House for presidential apparatment. Knapp told the cummittee. The post was vacated in Decemher when Donald N. Langenberg resigned from the deputy director post at Knapp's request; Langenberg now is chancellor of the

University of Illinois in Chicago. The NSF director also said that he expects to insward to the White House by early May a list of nominees for two other posts: the as sistant director for astronomical, atmospheric, earth, and ocean sciences (the post currendy held by Francis S. Johnson), and the assistant director for MPS, which had been vacated by Knapp. Nominees for the assistant director for biological, behavioral, and social science. soon to be vacated by Eloise E. Clark, would follow soon after that, -BTR

The second second

## Clash Over **NOAA Budget**

At the April 26 hearing on the National INOAA) budget by a Senate Appropriations subcommittee, Sen. Lowell P. Weicker, Jr. 1R-Conn.], electied the burget cuts proposed by NOAA and the Reagan Administration. 'I think it would be almost triminal' to agree to the proposed cuts. Weicker said, adding that although he understands the broad policy to trim the budget, the proposed cuts amounted to piecenteal emasculation . . . I won't be part

'I cannot help but note with regret that for the third year in a row the Administration proposed drastic reductions in oceans-related research and development said Weicker during the heating conducted by the Senate Appropriations Subcommittee on the departments of Commerce, Justice, and State, and the Judiciary. The proposed 37% cut in funding for fisheries programs combined with a 40% cut in other oceans and coastal activities would add up to an \$85 million loss for NOAA's oceans programs. To make cuts of this magnitude would be, in effect, to write off the great patential the oceans have for feeding our people and helping to power our economy, the Connecticut senator said. In short, the putential of the oceans as well as the pressures placed upon them have never heen so great-and they will be even greater tomerrow. In the face of Administration indifference and ourright hostility, Congress must maintain its commitment to the oceans and to the positive contributions they can make to nur future."

The flip side of the coin was presented by NOAA Administrator John V. Byrne: 'I believe our budget represents a balanced approach maintaining essential services in light of the need to exercise fiscal restraint. This budget will result in many changes from the way we have operated in the past, but these changes are for the better-changes that will make NOAA mote efficient in meeting our mandared responsibilities.' Byrne also said that the cuts to acean and coastal programs were made after looking at the overall agency hudget, though his personal bias would have been to increase the ocean and coastal pro-

When queried by Weicker about the proosed remination of the Sea Grant program, lyrne told the subcumminee that no one would question the success of Sea Grant. In lact, the Administration left it was because of its success that the program would be picked up teadily by the private sector. Weicker responded that by following such reasoning. the National Institutes of Health would be eliminated also. I can assure you there will be a Sea Grant program, Weirker said, It probably gets the highest number of people and states involved for the lowest number of dollars, he added.

House hearings on the NOAA budget were completed last mouth. Budget markup sessions in the House were to be held in early May. The Senare markin probably will unt be held until the end of the month.—BTR

# Geophysical Events

This is a summary of SEAN Bulletin, 8(3), March 31, 1983, a publication of the Smithsonian Institution. The entire Ema, Klinchevskoi, and Hunter Island reports are included; also included here is the report rut Asama, which will appear in volume 8, number 4. The carthquake report is an excerpt.

The complete bulletin is available in the microliche eclition uf Eos as a microfiche supplenient or as a paper reprint. Subscriptions to XEAN Bulletin are also available. For the microfiche, order document E85-004 at \$2.50 from AGU Fulfillment, 2000 Florida Avenur, N.W., Washington, DC 20009. For reprints, rarder SEAM Bulletin (give violume ad issue mumbers and issue dated through AGU Separates; \$3.50 for one ropy of each issue number for those who do not have a depusil account; \$2 for those who do; additional curies of each issue number are \$1.00. For a subscription, order SEAN Bulletin from rAGU Fullillaneut. The price is \$18.00 for 12 munthly issues mailed in United States address; \$28.00 [U.S.] if mailed elsewhere. Ortler must be prepald.

#### Volcanic Events

Kilauca (Flawaii): Eruption continues in middle east rift zone. Eina (Sicily): Lara from S flenk fissure; cen-

tral crater enlarged. Mt. St. Helens (Washington): SO<sub>2</sub> emission selsmicity, and changes in morphology of new lube may Indicate continued endogenous growth.

Long Valley (Celifornie): Seismicity declines to near background. El Chichon (Mexico): Continued monitoring of stratospheric cloud.

Klinchevskol (Kamchatka): Earthquek swarm then lava flow from NE flank vent. Asama (Japan): Incandesceqt tephra ejected; ashfall to 250 km

TRAVEL TO **IUGG GENERAL ASSEMBLY** 



AGU has arranged inexpensive group flights to the 18th General Assembly

of the International Union of Gendesy and Geophysics August 15-27, 1983 Hamburg, West Germany. Departures have been booked on

NORTHWEST ORIENT

on August 13, or you may choose from a wide variety of other available flights. Group rates are available from most major American cities (from \$619 round trip East Coast). For reservations and information, call



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Pagan Halariana Is.): Tephra deposits suggest 4-7 eruptions since May 1981. Ulawun (New Britain): Increased seismicity and vapor emission.

Manam (Bismarck Sea): Explosions, ash emissinns, and seismicity increase. Langila (New Britain): Activity declines. Hunter Island (New Hebrides): Vapor, ash,

and burning vegeration. Manhew Island (New Hebrides): White vapur from central crater.

Ruapehu (New Zealand): Dellation and Btype cartliquakes. White Island (New Zealand): No cruptive ac-

tirhy; B-type events increase. Erebus (Amarctica): Lava lake level drops alightly; explosion earthquakes; earthquake swarm near area of 1908 thermal activity. Mt. Melbourne (Antarctica): Franarolic actirity unchanged since 1972.

Rincon de la Vieja (Costa Rica): Teplira empion from crater lake. Arenal (Costa Rica): Lava extrusion contin-

Poás (Casta Rica): Fumarole and crater lake temperatures higher. Soulrière (Guadelimpe): Water temperatures

and chemistry. Ol Doinyo Lengai (Tanzania): Repuried February lava flow not found; strong gas emis-

sion entls; small ash-poor plumes.

Etna l'oleano, Sicily, Haly (37.73°N, 15.00°E).

All times ave local (UT + 2 h). Most of the folowing is from a reprort by Romolo Romanu. A descrictive south flank lissure eruption began on March 28, preceded by a series of strong earthquakes livst left during the night of March 26-27. At about norm on the 27th, a strong smell of H2S was noted from an old cone roughly 2 km S of the initial eruptime. Seismicity continued through the following night. At about 0845 nn March 28 a SSWtrending eruptive fissure opened from about

2450 to 2250 m altitude, coughly 4 km S thearing about 170°1 of the central crater. The base and the E sitle of this fissure fed several lava flows that initially nurveil toward the SSE and SSW then turned S. Weak explnsive activity along the entire lissure ejected modest quantities of lava fragments. By evening, the main flow had overrun a road and

several huildings. uumung nt April I, vigorous emission of gas, ash, and old lava, accompanied by occasional phreatic explosions, began from 2 explosion craters upslope at 2700 m allitude. At the end of the day, explosions from the snuthern vent ejected lave fragtnents. On April 2, nearly constant lava production formed a 500-m-wide lava field extending to 1900 in altitude. As of April 3, the lava had not odvanced below 1450 m altitude, 3.5 km from the fissure. At least four principal effusive vents were octive along the 750 m fissure and from its upper part strong gas emission with sporadic explosions occurred at

about 30 hornitos. Bands of open fractures, oriented about N-S, extended from the central crater area to die eruptive fissure. A substantial widening was noted at the S rim of Bocca Nuova, the western of Eina's two central craters and site of frequent collapse activity since Etne's last eruption in March 1981. Strong vapor emissions from Bocca Nuova sometimes included ndant ash: There was no activity from the NE and SE craters.

The temperature of the leva was less than 1100°C and its chemistry (phonolitic tephrite) was similar to that from some of the more recent eruptions. An area of more than 1 km<sup>2</sup> was covered by lava and the volume was esti-mated at about 8-10 × 106 m². The Istituto

Internazionale rli Vult anologia considered the emption to be a typical slow subserning type. The last activity of this type on the \$ nk was in 1780. Ellinsive activity had diminished by April 8 but on April 19 a law flow 300 m wide and 4 m high was advanced thown the S flattk and seismicity continued

The lava destroyed a calife car system that was one of Sicils's most important rouristatractions, and destroyed or seriously dans

aged more than 20 buildings. Information Connets: Remote Renamely tinuto Imernazionale di Vulcanologia, Viste Regina Margherita 6, 95123 Catania, habi Maurice Krallt, Equipe de Veleanologie Velcain, H. P. 5, 687401 Cernay, France; United Press International: Agence France Press.

Klincherskor Lukerno, Kranchatka Peniusida USSR (50.18"N, 160.78"E). An earthquake swarm on the NE Hank of Klinchevskii began February 28. The majority of the events had bed above sea level (Klinchevskoi's summit elevation is 4850 m) and their maximum magnitude was I. Based on the swarm's that arter, the Institute of Volcanology prediced that a flank remution would start between March I and 9, the March 8 a crater open at 3000 in altitude on the NE llank. Activity from the crater was joinely effusive, produc ing an andesitic basalt flow that was 3 km

long by March 18. Information Parmact; B. V. Ivanov, Institute of Volcourdray, Pip Avenue 9, Petropalovsk, Kamrliatskii fi89006 USSR.

Astron Volence, verteal Hurshit, Japan (36.10"N, 138.53°/.). All times are local (UT 9 korral. An explosive emption recured from Asama's summit crater April 8. Local seismic activity harl increased in mid March. har returned in background level in late March, In early April high-frequency B-1)P earthquakes and solcanic tremor were observed rime frequently than usual.

The eruption began at 11159. The air shock (amplitude, 0.2 millibars) and eruption earth quake (amplitude, 125 microus) were record eil at the JMA Karnizawa Weather Observainry (7.7 km SSE of the crater). Observatory personnel heard the thunder-like sound that accompanied the explosion, and observed the ejection of an incantlescent tephra column During the next 11 minutes, four more crup tion earthquakes were recorded; seisnic se tivity then declined rapidly. Only two volcan earthquakes were recorded between the intial explosion and 0600, when most activity

had ceased. By 0450, when the summit was first visible from the Observatory, a 500-m high, gray plume was being blown WSW from the sent init. The wind soon reversed, and ash was carried ENE, Near Ko-Asama, a lava dolite about 3 km E of the summit, 2.7 kg m of tephra accumulated, including laplili as large as I em in diameter. By 0600 activity was lim ited to a 300-m high vapor plume. No luther explosions had been recorded by simel A forest fire storted by the incandescent tephra on the S flank of Asama was exim-

guished by 0430. Asama's last eruption was a small explosion on October 2, 1982, 2 days after a sudden in erease in seismicity. Information Contact: Office of Volcanic Observation, Seismological Division, Japan

Meteorological Agency, 1-3-4 Ote-machi, Chiyoda-ku, Tokyo 100, Japan. Hunter Island Volcano, New Hebrides Islands SW. Pacific (22.40°S, 172.05°E). All times all cal (UT + 11 hours). A Vanuatu Governmen team visited Hunter Island on March 9 at 11200. White vapor tinged with gray ash billowed to an alunude of approximately 900 m. est to occur in the New Guinea-Solomon Islands area in 12 years, but no rasualties were port runway. The epicenter was almost bereported and the only major stenetural dammeath the city, and the MMi there was VIII.

Fellow in Geochronology and Isotope Geochemis-try/The Australian National University. THE AUSTRALIAN NATIONAL UNIVERSITY invites applications for FELLOW IN GEOCHRONOLOGY AND ISOTOPE GEOCHEMISTRY, RESEARCH

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torn ar any ome Applicants may obtain lurther particulary from The Registrar, The Australian National University, P.D. Box, L.Camberrar, Australia, with whom applicapous close on 21 June 1983.

Research Associate. The Stanford Linversity School of Faith Sciences and the Center for Materials Research seek research oriented selector for an mutal three-year appointment to start approximate. October 1 1983 whose responsibilities will include th Supervision and maintenance of a new XR1-XRII facility.

(2) Supervision of a new ESCA spectrometer, and (3) interaction with our microprofile technician in optimizing software for geological applications. Buries will furbide training faculty and sudem nervol the NRL NRD and ISCA, but not server. nvers of the NRL NRD and I St.A, but not service work, Experience to operation of NRL NRD, and/or electron microprobe required, we will main on the ESLA A good working knowledge of DEC Series II computers (11/02, 11/23, 11/34) operating maler the RSN-11M monitor and of FORTRAN level programming is escential. Although we envision that the Julius associated with this new equipment will constitute a full-time job for a year of two, we prefer Ph.D. level applicants who device eventually to develop their own tegrarch programs in con-

with prior Prints were applicants who treate eventually to develop their own research program in conjunction with Stanfood geology faculty.

Send U.V. to Gail Mahood, Department of Geology, Stanford University, Stanford, CA 94305.

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to fit student background, special interests, and experience.

Current research programs include: Amercic studies Including field and winterover programs), pollutant transport, tracer studies, complex terrain madeling, langualt emissions, global amospheric clemistry, and atmospheric monhoring.

Candidates are sought with 0.5 in meteorology (or equivalent), chemistry, physics or engineering. Stippend is \$6,900/mine month; \$11,500/metre in some cases. Tuhuan assistance available to soitable caudidates. September 1983 and February 1984 enrollments available.

Cantact E. Robinson, Air Pollution Program, 300

inens available.
Cantact E. Robinson, Air Pollution Program, 300
Dana Hall, Washington State University, Pullman,
Washington 99161–2730 or telephone collect for
further information 509-335-1526.

Mesoscale Research Section of the Atmospheric Analysis and Prediction Division (AAPI/Ph.D. Selectist I or II (Two Positions). The National Center for Atmospheric Research in Boulder, Colorado's recruiting for Scientist I or II to do basic research studies on small-scale or the transfer in the tendency of the research will be selected and defined in collaboration with the senior staff. The primary enphasis will be in advancing the fundamental understanding of important mesoscale processes and their standing of important mesoscale processes and their interactions with smaller scales of motion. Both theoretical and observational studies will be encouraged; the main goal is to improve the skill of mesoscale forecasting.

rale forecasting.

REQUIRES (LEVEL I):

Ph.D. dissentation or equivalent research contribution in moteorology nr related field.

Demonstrated expertise/interest in small-scale or mesoscale meteorology

Demonstrated skill in effective written and

oral communication

Strong mathematical background

ADDITIONAL REQUIREMENTS [LEVEL II]:

Osfrong mathematical text of the control of th

age was the collapse of a concrete pier at Muna on the E coast of New Ireland Jabout [till kin NW of the epicemer). Four small isn-Date riamis with a maximum amplitude of 25 cm were recorded between 1945 and 1145 UT in Raband harbor (about 170 km WSW of the epiventer). Landslides and suow avalanches riggered by the March 25 earthquake about 80 km NE of Tehran killed about 90 motorists and injured about 40 on the Haraz highway between Tehran and Amol, on the Caspian Sea. Two mountain villages were reported leveled, with about 10 persons dead. Another shock the next day, in virtually the same place, ransed more injuries and damage. At least 225 persons were killed in Popayan, capital of Cauca department, by the March 31 earthquake. In nearby towns, in-rhuling Piendamo, Morales, and Timblo, 16 were killed. About 1500 were injured, [10], 100 left homeless. The widely felt shock destroyed 80% of the city, including the air-

(UT) Magnitode Latitude Longitude Reginn March 8 99 km Off NE Venezuela March 12 0137 127.92°E shallow Handa Sca March 15 1717 34.84°N 137.4U°E 45 km Hunshu, Japan March 18 7.8 AL.\* tigori 4.80°S 153.51°E 88 km March 23 2351 6,0 M, 38.57°N 20,60°E 10 km W Greece Narch 25 1158 5. | m<sub>h</sub> 35 06°N 52.33°E N Iran March 26 0407 5.3 m<sub>h</sub> 36.17°N 52.17°E shallow March 31 1313 5.5 mm 2.-13°N 76.63°W 10 km SW Colombia

\*University of California, Herkeley, magnitude 7.9

Information Contacts: National Earthquake nformation Service, U.S. Geological Survey, Stor 967, Denver Federal Center, Box 25146, Denver, Colorado 80225 USA; P. Lowenstein, Senior Government Volcanologist, Rabaul Voltano Observatory, P.O. Box 386, Rabaul, Papua New Guinea; J. Rafael Goberna, S.J., Universidad Javeriana, Inst. Geofisico. Gra. 7, No. 40-62, Apartarlo Aereo 56710, Botora, D.E., Colombia; Islamic Republic

News Agency, Tehran, Iran; Agencia EFE, S.A., Madrid, Spain; United Press Interna-

#### **Meteoritic Events**

Meleorite Fall: Tennessee, USA, January

28; petrographic information. Fireballs: East Germany; southern Califor-

# Classified

from the main artise crater on the W side.

and drifted to the W and NW, Furnaroles

and two small superimposed creaters on the

SE side were also framing. Vegetation on the

which suggested that the emption had begun recently, By 4200, the fires had reached the

central spine of the island and could be clear-

ly seen from the anchorage on the NW yeast.

The last reported emption of Hunter Island was November 24, 1895. Aerial photos

of Humer taken in June 1979 showed no at -

Information Contact: A. McFarlane, Direc-

tor, Department of Beology, Mines and Rural

The March 18 carthquake was the strong-

Water Supplies, GPH, Port Vila, Vanuatu.

lower slopes of the E coast was burning.

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Hydrologist, Geo-Englueer, Geo-Scientist. Geophysicist desires position in ground-water, folk engineering, geophysical geological exploration or interpretation. Terbula all harkground including extensive geophysical and geological surveys, mapping, interpretation; data processing; groundfact another; soily and soil mechanics; study on High Resolution Reflection. Contact MRC, 27 Oak Fourt RR-6, Alerbland, NJ 08055 for more information, Etypi55-1427.

POSTITIONS AVAILABLE

Selmologist. Lamour-Hoberty Gerdogical Observatory of Colombia Unicersity series a seistandogical with strong recease is interested in receival with strong recease in interests in recromic soul computational methods applicable to digital network data from a major seisting gap at a sudulutchor rone. Pathipation in ougoing research program and resciousment of future research proposals are expected, beginning on applicant's experience and qualification the position will be fulfiel at either the productoral or amortate research is cientia level. Send resource, with middle attons or marries ripus and in least three references to: Dr. Klaus Jacob, Lamour-Doberty Geological Claussia, Lei.

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Structural Geology/Petrology. Lalayette College seeks a person on teach matergraduate physical and structural geology, ignemis and metamorphic petrology, and additional courses, dependent on applicacy merces. Additive to teach formulaciony geophylics is desirable but not mandatony. Teaching load averages ten to twelve contact hums and two course/semeater. Appaintment as assistant professor IPh.D. complete) or instructor IPh.D. pending!. Send application and resume, and arrange for three reference leners to Dr. Richard W. Faas, Department of Geology, Lafayette College, Easton, PA Lafayette College.

er. Mrs. Women and infinorities are encouraged to

University of Colorado, Bouldee, Geochamist Position. Geochemist with active research program, stable isotopes, radioactive tootopes, and/or nuce clements is being sought for a joint appointment in the Department of Geological Sciences and the Cooperative Institute for Research in Environmental Sciences (CIRES) of the University of Colorado.

The one-half time position within the Department of Geological Sciences is tenore track at the assistant or attodate professor level with a starting salary of \$12,000—\$15,000 for the academic year.

Teaching load will be liaff that of full-time faculty, the position within CIRES will be as a Fellow with appropriate office and laboratory space. One-liaf academic year salary will be guaranteed by CIRES for two years at the departmental rate, after which incumbent acusts generate his/her CIRES salary from external sources, Incumbent may augment mer salary further by generating three mondits of suntages.

Applicants with experience, publications, and/or Applicants with experience, publications, and/or movable existing research equipment preferred. Preferred starting date would be January 1, 1984. Closing date for applications is October 1, 1989. Applications should include exacement of research four letters of reference, a full vice, and leaching interests, experience, a full vice, and Apply to: Professor Charles Siern, Chairman, Geochemist Search Committee, Department of The University of Colorado Is an equal opportunity/affirmative action, Section 504 employer.

Faculty Position in Sedimentary Geology at the University of South Carolina. Applications are invited for a tenured track faculty position in the Department of Geology with a specialization in soil

invited for a tenured track faculty position in the Department of Geology with a specialization in solimentology starting as early as Angust 1983. Ph.D. required, Rank and salary are open depending on qualifications and experience. We seek a cardictate whose research interests are in one or more of the following fields: carbonate depositial systems, basin analysis, global sediment cycling, stratigraphy and sedimentary geochemistry.

The successful candidate is expected to develop a strong research program with external finding, supervise graduate students, and teach graduate and undergraduate courses. Send lener of application, vitae, statement of research interests, and names of three references to: Dr. Robert F. Thunell, Department of Geology, University of South Carolina, Columbia, SC 20208.

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Director, Texas Water Resources Institute/Texas A&M University. QUALITY ATTONS, Ph.D. in discipling related to water research and established record of research in one or more water-related fields. Experience in research administration is de-

TILL LITES AND RESPONSIBILITIES The Direct DUTILS AND RESPONSIBILITIES: The Director plans and manages state-wide water recognors research and manages state-wide water recognors research and more approach to water research at Texas A&M Priversity and sponsors research at several universities across the state. The Hitector manages the Thie I Program of the Office of Research and Technology in the Department of the Interior; an information and technology transfer program which communicates research results to potential users is a significant component of the Institute's program. Interaction with water agency officials throughout the state and nation is an important aspect of the Director's responsibilities. The Hitector serves as a coordinator of the water research program in the

the sate and nation is an important aspect of the Director's responsibilities. The Rincetor serves as a coordinator of the water research program in the Texas Agricultural Experiment Station and for water-related, educational programs in the Texas Agricultural Extension Service. Close association with Texao A&M University provides the opportunity to participate in graduate programs of academic departments with significant activities in water research. Academic appointment in the appropriate department is available. The Institute is administratively assigned to the Texas Agricultural Experiment Station. For matters related to the reference of the Director of the Texas Agricultural Experiment Station. For matters related to the reference of the Director of the Texas Agricultural Experiment Station. For matters related to the recipnology transfer program, the Director is responsible to the Director of the Texas Agricultural Experiment Station. For matters related to the recipnology transfer program, the Director is the results of the Covernor in response to letteral legislation in 1964. Funding for support of its program comes from federal, state, and private sources. A hroad-based Water Resources Officials Advisory Committee assists the Director in Identifying the important water research needs into well-defined research programs which will be considered for sponsorability by the Institute. An important role of the Institute is that of serving as a state-wide focal point for water research and, thereby, working with a broad array of agencies, institutions, and organizations. The significance of this role is emphasized by the fact that water aupply and distribution is the most critical issue in Texas. In recognition of the critical instruct of water problems in the state, A history assertion of agencies, in the placed on technology transfer and interesting the terms in die state, the institute is partning a majur expansion of its programs. Increased emphasis will be placed on technology transfer and increasing the scought to accomodate this expansion as well as to increase the magnitude of effort on existing pro-

POSITION AVAILABLE: July ID83. Nominations and applications with current cor-ulum vine and the names of at least three referutum vitae and the names of al least three references should be sent to:
Edward A. Hiler, Chairman
TWR1 Director Search Committee
Department of Agricultural Engineering
Texas A&M University
College Station, Texas 77843
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Postdoctoral Fellowahlp or Research Associateship in Geophyales at the University of Torooto, Bilodale Campus. Salary: PDF, \$18,500—\$19,500 depending on experience: Research Associate Imore than two years froot Ph.D.), minimum \$19,500. Duration: one year, from July 1, 1983; renewable for a second year if fuoding pennits.

The successful candidale will be responsible for teaching a third-year undergraduate half-course in Physics of the Earth and will carry on research in Precambrian paleomagnetism and/or chemical remanent magnetization.

Qualifications Ph.D. in paleomagnetism or rock the course of the precambrian and at least one year's lecturing experi-

Qualifications: Ph.D. in paleomagnetism or rock inagnetism and at least one year's lecturing experience. For appointment as a Research Associate, two or more years' experience in paleomagnetic research beyond the Ph.D. is required.

In accordance with Canadiao immigration requirements, priority will be given to Canadian chlacens and permanent residents of Canada.

Send curriculum vitae and the names of durec referees to:Dr. D.J. Dunlop, Erindule College, \$359 Mississauga Road North, Mississauga, Ontario, Canada L5L 1C6.

GFD Position/Texas A&M University. The Desero roution/texas A&M University. The De-partment of Oceanography of Texas A&M Univer-sity has an opening for a termie track assistant pro-fessor in physical oceanography to be filled by I September 1983.

Preference will be given to candidates with strong theoretical background in geophysical fluid dynamics.

The successful applicant will be expected to reach undergraduate and graduate course) and to conduct a opposition seesarch program in his or her specialty. A Ph. D. is required for this position and one year's experience in a postdoctoral position is desired. Salary is postdoctoral position is desired. Salary is postdoctoral position is desired. Salary in postdoctoral position of the postdoctoral position.

and you begain an educating upon experience and qualifications.

Applicant should submit a vita along with a letter describing his/her research and teaching goals and naives of five persons for veference to Prifessor R.O. Reid, Head. Department of Oceanography, Texas A&M University, College Station, TN 77843. The closing date for applications is May 31, 1983. Texas A&M University is an affirmative action?

tgneous or Metamorphic Petrology. The Hepati-ment of Geology seeks to fill a termine track position in petrology beginning either August 15, 1983 or January 1, 1985. Appointment will be at the rank of assistant professor. Post-doctoral experience is con-sidered important. The successful candidate will be expected to develop an aggressive research pro-graduate levels and interact with an active group of facility and surfection in numeralogy, petrology and geochemistic. Research facilities in the department include: automated electron inferoprobe, solid-source mass spectrometer, gas-source mass specsource mass spectrometer, gas-source mass spectrometer, SEM, A.A. non-automated XRF, and Horls 300 conquier. Please send a resume a statement of research merests and the names of a least three references to: Charrman, Petrology Search Commuter, Department of Geology, Northern Blinois Philosophia. rsity, Delalli, Ulinois 60115. Applications will be accepted until position is

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Research Positions for Mathematics Physiciats. Applications are invited for several re-search positions at the Center for Studies of Nonhin-ear Dioamics, La Jolla Inditute, beginning summer 1983, Current research involves work on nonlinear wave-wave interactions, acoustic, optical, and rudio wave propagation in fundont media, and fluctuation phenomena in the statistical mechanics of chemical phenomena in the statistical inectionies at circularly and geophysical systems. Physicists and applied mathematicians who are interessed in working on problems of the above type should send resomen and arrange for three letters of recommendation to be sent to Dr. Stanley Flatte, Director, CSND, La Jolla Institute, 895D Villa La Julia Drice, Suite 2150, La Jolla Institute is an equal opportunity/affirmative action employer.

#### UNIVERSITY OF GLASGOW **DEPARTMENT** *OF GEOLOGY* LECTURESHIP IN CRUSTAL SEISMOLOGY

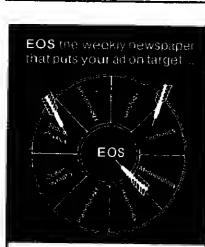
innlications are invited for a new Lectureship in Crustal Seismology tenable in the Department of Geology from October 1983. The Department occupies a naw 5 floor building, has 16 full-time end 3 part-tima academic staff and is equipped with seismographs and other geophysical equip-

Applicants should be not more than 85 years of age. Salery will be within the range £6875—£13,505 on the Lecturers' scela (under review) with placing according to age, quailficatione end experience.

Further particulars may be obteined from the Secretary of the University Court, (Room 18), University of Glasgow, Glasgow G12 8QQ with whom applications (8 copies: 1 copy in tha case of overseas epplicants), giving the names and addresses of three refereas, should be lodged on or before 20th Mny, 1988. Late applications from ovarseas will be considered; telegram in the first instance if neces-

In raply plasse quote Raf. No. 4965. 

373



Advartisa in EOS- iha provan way lo gel your messaga across lo Ihaae specially largeted audiencas. For raies, information, or to place

Robin Little Advartising Coordinator 800-424-2488 or 462-8903 (local) .. and hit the bull's-eye with your message!

ACU

Geology (with emphasia on petrology)/University of California, Riverside. Vitiling Lecturer opening beginning I September 1983. Although the initial appointment will be as a lecturer, and is annually renewable, the appointment could lead to a ladder tenthy position next year.

Appointer would teach at both undergraduate and graduate levels and should be able to teach several of Petrology, Mineralogy, University of California. Geology, Physical Geology, Physi

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letter after the name denotes the proposed

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which was formerly the Meteorology section.

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Send applications to Dt. Lewis H. Cohen, Department of Earth Sciences, University of California, Riverside, California 92521.

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The University of Bergen/Chait in Solid Earth Physics (Marine Geophysics). Salary is on the scale 51, Nkr. 192.589 p.a. gross, of which Nkr. 3.301 p.a. are paid in pension contributions. The chair will be appointed on the understanding that any changes in scientific duties, pension or retiring age made by law or by the King with the agreement of Parliantent are to be accepted without compensation.

ington, MA 02178. Attention: Dr. A.M. Gerlach. SASC Is an equal opportunity/allitmative action compensation.

Applicants should submit five copies of scientific work—published or unpublished—which they wish to be considered for the appointment as well as six copies of a list of all scientific contributions with information on where they were published. Scientific contributions are to be submitted, in numbered order and in five grount to the signer feature of the University of Georgia/Faculty Positions. The De-partment of Geology anticipates hitting as many as live people at the rank of Assistant or Assistate Pro-fessor, on either a permanent (tennic track) or temcontributions are to be submitted, in numbered or-der and in five groups, to the science faculty of the University of Bergen within one month of the clos-ing date for applications. Scientific manuscripts in preparation may be submitted within three mouths of the closing date for applications provided notice of intent is given on submitting the other publica-tions. Applicants are otherwise referred to the cut-rent rules for the procedure to be followed in the appointment of professorships and readerships. A resume of the cacant chair can be obtained on request from: porary basis.

Duties include reaching multi-graduate and grad-Duties include teaching undergraduate and graduate courses and combining research.

Teaching/research specializations to be considered indude: economic geology, geochemistry, mineralogy/petrology, paleontrology, sedimentation, structural grology, geophysics, and marine grology.

Letter of application—including a statement of specific teaching and research interests, sturriculous vita, and names and addresses of three references—should be sent to: Heard Department of Geology University of Teorgia

Athens, GA 30002.

Deadline for receipt of applications is Jone 20.

A resume of the same request from: Dec matematisk-naturvitemkapelige fakultet postboks 25 5014 Universitetet i Bergen

By decision of the collegium applications from Norway
By decision of the collegium applications from women are especially encouraged.
Applications, which must include a complete curriculum vitae, should be addressed to the King and be sent together with relevant certificates and one copy of a list of publications to Det maternatisknaturvitenskapelige fakulter, postboks 25, 5014
Universitetet i Itergen before Angust 12th, 1983.

Temporary Position: Igneous Petrology and Geophysice/ University of Montana. Applications are imited for one substitual replacement at the institution of 1983-84 academic year. The pennal of contract obligation will be approximately January 3, 1984 in June 8, 1984. A graduate suitent who will have completed a doctorate before September 1983 or anticipates numpletium sometime during the perind of employment would be appurpiate for this division.

The Department is looking for someone to teach undergraduate geneous petrology and pethaps a course in geophysics. The average department course land per quarter is two courses.

The position is replacing a faculty identifier on tabbancal and dierefore is not permantent or on a

ienore track. To apply Send a resume and two let-jers of recommendation to: Arnold J. Silverman. Chairman, Department of Groboge, University of Monana, Missoula, MT by May 15, 1980 The University of Montana is an equal opportuna v/affirmative action combours.

Meteorologist/System and Applied Sciences Curparation [SASC]. Immediate opening. For developing gorithms for operational prediction of annisphetic extinction in visible and near-LR. MS and experience in radiative transfer and FORTRAN required Resume to SASC, 109 Massachusetts Avenue, Lexington, MA 02178. Attention: Dr. A.M. Gerlarb.

Alterns, GA Manus.

Deadline for receipt of applications is Jone 20, 1983, Should sufficient conditates not be found, another search may be upened.

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Seismic Riek/University of AntOlee-Guyane at Poloteà Pitre (Guadeloupe). Objectives. The school will give a modern and muhidisciplinary view of the problem of seismic risk. It will integrate state of the art knowledge about tectnoics, focal mechanism of earthquakes, near field recordings and tectnoiques of seismic engineering. It will be addressed to sudents having a background enjeatent to Master in Geophysics, an engineering degree or a post-graduate training in stiences.

The courses will cover three main subjects: (1) Seismic risk and seismorectonics. (2) Caribbean subduction, and (3) Seismic engineering.

The school is open mainly to French students.

dents from South America, Central America, and

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the Carddwan region, and from the United State. The School will take place on the campus of the United State. Cincersate of Antifles Lowane at Pointed Pitte Gade Integration Into 17 to July 30, 1983, Schoolse Committee R. Gardou, A. Fristenson, J.M. Vill, Insulate de Physique du Globe 4, Place Junio, Tag. 14, 24, 752, it Paris Codes 105, France.

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Large-Scale Computations by Fluid Mechanic. An AMS-SIAM Summer Seminar in Applied Mathematics will be held June 27-July 8, 1983 a Strippe Institution of Creanegraphy, University of California, San Diego, La Jolla, Ualdornia. The members of the organizing comminee are Alexandre J. Chorin (Phicesite of California, Berneley), Born E. Engine (University of California, Los Angeles), Stanley J. Other (University of California, Los Angeles), and Richard C.J. Songreille, Chaliman, J. University of California, San Bergot.

The propose of this seminar is to bring stients invested in computational fluid mechanics together with minerical analysis and mathematicians.

er with influent at analysis and mathematicians working in large-scale computations. The numerical modeling meludes grouphesical problems such as those of the atmosphere, overal, and interior of the earth and planetary, solar, and stellar amosphere.

For Intiliar information contact the Meetings Be-partment, American Mathematical Society, P.O. Box 6248, Providence, RI 62940, (Please refer to the de

play ad appearing in Ects, ed 64, No.17.1

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**Meetings** 

# Announcements

Global Carbon Cycle

The Sixth Oak Ridge National Laboratory Life Sciences Symposium will be held October 31-November 2, 1983, in Knoxville, Tenn. The Global Carhon Cycle: Analysis of the Natural Cycle and Implications of Anthropo genic Alterations for the Next Gentury' will be the meeting's theme.

Sessions will include the historical record of atmospheric GO2 and its implications; isompic and geologic time series as proxy records of carbon cycle processes; the role of ocean biogeochemistry in the global carbon cycle: mathematical models of the global carbon cyde; the influence of the world's biosphere on changes in atmospheric GO2 levels; and past and future releases of CO2 from fussil fuel

The meeting will be cosponsured by the U.S. Department of Energy, the National Science Foundation, the National Oceanic and Autospheric Administration, the Electric Power Research Institute, and the Gas Research Institute.

Symposium proceedings are to be nublined commercially. For additional information contact Debbie Shepherd, Oak Ridge National Laboratory, P.O. Box X, Building 1505, Oak Ridge, TN 87830 (relephone: 615-

#### Geophysical Year

New Liatings

The complete Geophysical Year last appeared in the December 21, 1982, Eos. A holdface meeting title indicates sponsorship or cosponsorship by AGU.

May 24, 1983 Water Resources Planning for the Missouri River Basin, Spousors, College of Engineering and Engineering Extension of the University of Missouri-Columbia; the University of Missouri Water Resources Research Center; the University of Missouri-Rolla Institute for River Studies; the lowar State University Water Resources Research Institute; the Midwest Research Institute; the Missouri River Shippers and Operators Committee of the Missouri River Basur Associauon; and the U.S. Carps of Engineers, Kansas Gity elistrict. IVinginia Nettleton, Universiry of Missouri-Columbia, relephone: 314-882-

June 1-4, 1983 Coastal Zone 83, 3rd Symposium on Coastal and Ocean Management, San Diego, Calif. (Orville T. Magoon, General Chairman, Coastal Zone 83, P.O. 80x 26062, San Francisco, GA 8-112fi).

July 6-8, 1983 1983 National Conference oo Environmental Engineering, Boulder, Colo. Sponsor, Environmental Engineering Division of the American Society of Civil Engingers. (Allen J. Medine, Civil and Environnental Engineering, University of Colorado, Soulder, CO 803119; relephone: 3113-402-

October 31-November 2, 1983 Sixth Oak Ridge National Laboratory Life Sciences Symposium, Knuxville, Tenn. Sponsors, U.S. Department of Energy, the National Science Foundation, the National Oceanic and Atmospheric Administratiun, the Electric Puwer Research Institute, and Gas Research Insti-

#### AGU CHAPMAN CONFERENCE ON MAGNETIC RECONNECTION

October 3-7, 1983 Los Alamos, New Mexico Convenor: E. W. Hones, Jr.

Abstract Deadline: July 1, 1983

Invited and contributed papers Topics

Theory of Reconnection

 Computer Models of Reconnection Reconnection in Earth's Magnelolall

Reconnection at Earth's Magnelopause

Reconnection in Laboratory

 Reconnection in Astronomical Objects

Contact: AGU Meetinga: 2000 Florida Avenue, N.W. Washington, D.C. 20009 (202) 462-6903 D.C. ares Ioll free 800-424-2488

Cell for papers published in EOS. March 29, 1983

tote. (Debbie Shepherd, Oak Ridge National Laboratury, P.O. Box X, Building 1505, Oak Ridge, TN 37830, telephone: 615-574-7302).

Geological Society of America Availal Meetings (Jean Lutwhppe, Geological Society of America, P.O. Bay VI40, Bowley, CO 80301; telephone 303-447-2020):

Octobee 3)-November 3, 1983 Indianapolis, Ind.: November 5-8, 1984 Reno, Nev.; October 14-17, 1985 Boston, Mass.; November 10-13, 1986 San Antonio, Tex.; October 26-29, 1987 Phoenix, Ariz.

Februacy 20-24, 1984 Ghapman Conference on Gollisionless Shock Waves in the Heliosphece, Napa, Calif. (Meetings, AGU, 2000 Florida Avenue, N.W., Washington, DC 2000gta

American Congress on Surveying and Mapping National Meetings (Willard A. Kuncis, 4415 Jen sen Pl., Fairfax, VA 22032; telephone: 202-425-

March 11-16, 1984 Washington, D. C.; March 10-15, 1985 Washington, D. C.; March 16-21, 1986 Washington, D. G.

May 21-23, 1984 International Grunndwater Symposium on Groundwater Resources Utilization and Contaminant Hydrugeology, Montreal, Canada. Spunsors, Canuclian National Chapter of the Internationa Association of Hydrogeologists, and the Ga-nndlan Water Well Association. (A. Kohut, Chairman, International Groundwater Syn posium Montreal '84, Ministry of the Environment, 764 Broughton Street, Victoria, Bridsh Columbia, Ganada V8V 1X5).

May 24-28, 1984 Symposium on the Hispory of Soil and Water Conservation, Columbia, MO. Sponsors, Missoun Cultural Heri-

Awardees Syun-Itl Akimoto - Bowis Medal John W. Handin - Bucher Medal Fred Noel Spless - Ewing Medal S. Kelth Runcorn - Fleming Medal William L. Chameldes - Macelwane

1983 Medalists and

Award Donald J. DePaolo - Macelwane

Thomas H. Jordan - Macelwane

Waldo E. Smith - Waldo E. Smith

The 1983 Bucher Medal will be presented to John Handin at the Fall Meeting.

#### Fellows

Peter L. Bender, Geodesy Herbert S. Bridge, Solar Planetary Relationships Marx Brook, Atmospheric Sciences Harmon Cralg, Volcanology, Geochemistry & Petrology Lynn W. Gelhar, Hydrology G. V. Gibbs, Volcanology, Geochemistry & Petrology Dannis E. Hayes, Oceanography Andrew P. Ingersoll, Planetology Hugh H. Kleffer, Planetology Michael W. McElhinny, Geo-

magnetism & Paleomagnetism John G. Ramsay, Tectonophysics Frank M. Richter, Tectonophysics

**AGU Honors** 

Jacob Rubin, Hydrology Edward C. Stone, Solar Planetary Relationshipa James R. Wallis, Hydrology

Four Fellows who did not receive their certificatea in 1982 will also be Bemard H. Chovitz, Geodesy James R. Holton, Meleorology

V. Rams Murthy, Volcanology, Geo-Chemistry & Petrology Klaus Wyrtkl, Oceanography

#### Join in the Festivities

The Honors Ceremony will be held in the Francis Scott Key Ballroom of the Baltimore Hilton Hotel at 6:00 P.M. on Wednesday, June 1. All meeting participants are invited and are urged to attend. A Reception will follow the ceremony; you can meet and congratulate those being honored and share a glass of wine with them.

The President's Dinner In honor of the medaliata, awardees, and Fellows will begin at 8:00 P.M. It is a more lavish and formal affair, with black tle optional. Ticketa for the dinner are \$25 per person. You may order your tickets with your advance registration, purchase them at the meeting, or call AGU toll free at 800-424-2488 (462-6903 In the D.C.

tage Center at the University of Missouri, the Agricultural History Society, and the Soil Conservation Service of the U.S. Department Agriculture, (Susan Flader, Department of History, University of Missentti, Columbia, Missomi 65211, relephone: 314-882-2481 or 314-442-1058; or Donglas Helms, Historian, Soil Conservation Service, P.O. Box 2890, Washington, D.G. 20013, telephone: 202-382-

May 29-June 1, 1984 Joint Meeting of the 11th Annual Meeting of the Canadian Geo-physical Union and the 18th Annual Congress of the Canadian Metenrological and Oceanographic Society, Nova Scotia, Canada. (Atlantic Oceanographic Laboratory, Bedford Institute of Oceanography, P.O. Box 1006, Dart'month, Nova Scotia B2Y 4A2).

June 25-27, 1984 Symposium of the Achievements of the International Magneto spheric Study, Graz, Anstria. Sponsor, Scientific Gommittee on Solar-Terrestrial Physics of the International Council of Scientific Unions. (J. G. Roederer, Geophysical Insti-tute, University of Alaska, Fairbanks, AK

#### Changes

june 26-28, 1984 International Symposlum on Deep Structure of the Continental Grust: Results from Reflection Selsmology, now cosponsored by AGU.

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# Separates

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CLASK LAWLES COLLECTE AT THE JUNGSPAULOCH RICH.
ALTHORS RESEARCH STATION (1300 m a.s.):) AND JITH
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C. Todarum (Physics Institute, Bisteresity of Sern.
E. J. Friedi (and D. Kauber
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for

#### Meteorology

1715 Chemiss' composition and chemiss! interastions CIRCHUS CLOUD TRANSPORT OF TRANSFERT TRACERS

STIS Chemissi composition and chemissi issignations CRGHUS CLOND TRANSPORT OF BRANSPORT TRACERS
L.T. Gidel (Melecrology and Physical Oceanography, School of Marias and Atmospheric Selence, University of Missi, 4600 Electrobacker Causemy, Missi, Florida 33149)
A Insuretissi Tramswork le developed for Insluding cumulum cloud transport, reinaut of water soluble gases, and squeeue phase chemistry toto gas phase photochemical models. Clend populations are represented en esseable distributions of individual clouds of vertous heights. An individual cloud is represented as a one-dimensional, sleedy state plans with height ladespeaders redise entrelsing set from the boundary of the cloud. The model is applied to several hypothetical espospharic isracers to show how slouds may affect the iropospharic distributions of cosme, KD,, 502, PAN, hydrocarbons and other gases. Although the numerical apprisents were based on thou asses Tiuxes from diagnossis studies in the tropics, sed thus are not representative of the entire globe, it was found that an increasing sizing rol to uith height is the cree troposphere can be produced for some gases with maly a purface sourced when slouds are present. This suggests that some resortive tropospheric species with primarily surface sourced when slouds are present than it persently be level depending as the cloud distribution of cloud mass fluxes. Doffsientia is existing photospherical models due to the way slouds are spycelly treated are dissussed.

J. Geophys. Res.; Greeo, Fapar 300445.

J, Geophys. Res.; Green, Paper 300445 : 1.

J. Geophys. Res., trusts and chemical interactions.

1 5715 Chemical composition and chemical interactions.

A TWO DIMENSIGNAL PROTOCERNICAL MODEL OF THE ATMOSPHERM

I. CHARLES DE BLAND STATE PROTOCERNICAL MODEL OF THE ATMOSPHERM

E. T. Chiefe | City being of Maledrology and Physical General Preparate pools.

I. T. Chiefe | City being of Maledrology and Physical General Strephy, University of Himsis, Klassi, Florida, 31149).

F.J. Cretter and J. Firsten,

A two-discussional photochemical model is sended to:

exemical charges to the sense inyer due to selfentees bl

creti, C72(1), C92(1) and CG1. The influence of a possible secular incrones to troposphetic mechane up to possible secular incrones to troposphetic mechane up to possible secular incrones to troposphetic mechane up to

modes Caronacte unone continues are articular to person a boot 15 by 1980. This estimate is higher than sattants by slatiar models, afthough we note shat CCL4 and CRCC13 and CRCC12. This is significant because the codel leaders that CCL4 has dominated the quone depletions so far, and knowledge of the bistorical enterior so for rate of CCL4 to the disceptors is isomorphic. There remain sufficient, significant dispressments between the perfectical and observed toncontrations and variabilities particularly loss of extragence and CLO, to entire spainest assigning too such confidence in the calculated once depthild.

J. Gamphyo. Res., Green, Paper 3004A4

3715 Chapical composition istratosphoric susers Internatival variations of GLOBAL TOTAL GOOME REVEALED FROM HIRBID & BUY AND ORDUND-BASED GESERVATIONS F. Hasehs (Geophysical balltute, Kyolo University, Syoto 565, Japan)
To lavanigate loisrancus variessom in glotal distributions of total cooms, as objective analysis is sade by the hybrid use of Mimbes & BUY oud ground-based nativers dala, Much improvement is spatial resolution and railoshity of the semiyes is estain testimation and dound line changes in enven years (April 1970 - May 1977) the quest-baseis) and four-year optilations (GBO med FVO) are separated by constitut Thiering. Chargotarishio festures of these modifications are investigated by guaranining line changes of global philistra as sell as some spatial cans values. The CBO (s total costs is chargotarized by terms of the constitution, positive devictions sears) coloreds with the vesterir phase of squajorial scars; coloreds with the vesterir phase of squajorial scars; coloreds applicated antiferror propagation are charges arbitising cross-squaiorial sortimer propagation are charged arbitising cross-squaiorial antiferror propagation are charged at the complete startibutions are assonpanted by consil vavenumber 3-4 disturbances. In northern high latindes, deviation experience of the same realism of the phase is reversed stroud of 155 and marries out-of-phase relation to horthern stillations is

observed. Sevenustor ) is the dominated wave component throughout the scatters healsphere.

The FTO is total oxons is neggested as a clobel phenomenos. This onotilation is observed as a follows: A roughly symmetric distribution with respect to equator is observed with the sol-of-phene relation between tropion and extratropion. There also appears a phase propagation starting from southers aid and high latifieds and reaching corthers high latitudes. In the equatories region and southers metallisides. In the equatories region and southers intellistee. In the equatories region and southers intellistee. In the equatories region and southers intellistee. For both QBO and CTO, giasolisty casel total oxons ways of zonal savanonber i is the wister hemisphere are seen to paterate lato the summer benisphere. [Total passes, optimus laterpoletion, quasi-blandial oscillaling, four-year one litation].

J. Geophge. Res., Green, Paper 300392

# Ionosphere

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SMAIL-SCALE AURORAL ARC DEFOUNATIONS
John S. Wagern, R. D. Cydore, T. TajSas, T. Hallfnan,
L. G. Les and O.-T. Akanofu (Geophysics) Institute,
University of Alaske, Faithsoke, Aleska, 99701).
An current ere bedeignes various types of
deformations, such as curie, folds and aptrale. In
this paper, as causies the Formacion mechanism of
folds by a plassa simulation, and the engagest ties,
folds, as smil se curie, cast eries from electroelectic
pheer Induced to nathitities. The difference betamen
the two forak ere controlled by the presence of
aphtent loss which cast be present to chiefd the
alestric field of the prescriptering electron charge
shapet. It is shown that ouris form when the ten
should biddiess to large in amperiess of the
sicetron shart. Folds form when the ion should be this
and logs elightly behied the alectron guiding centers,
satting up as additional electron guiding centers,
satting up as additional electron provides
the later stages of lostability growth.

J. Geophys. Res., Cipe, Paper 328531 C. . . . Georgys . Hes. , Clus , Paper 340533

374

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